Learning Objectives

Viruses

- ☐ Identify the structures and functions of bacteriophages and retroviruses
- ☐ Describe the life cycle of (1) lytic and (2) lysogenic viruses
- ☐ Describe the body's defense mechanisms against a viral/bacterial infection

Kingdom Monera

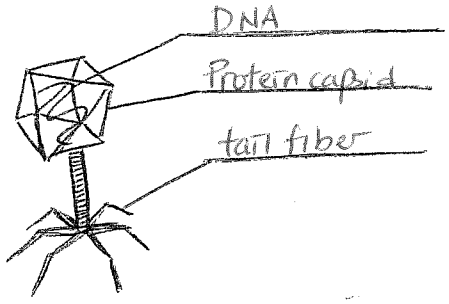
- ☐ Identify and label structures of a generic Moneran
- ☐ Identify and describe the four criteria through which Moneran are classified
- ☐ Describe the ways in which Moneran obtain/metabolize energy
- ☐ Describe the three ways Moneran reproduce

Kingdom Protista

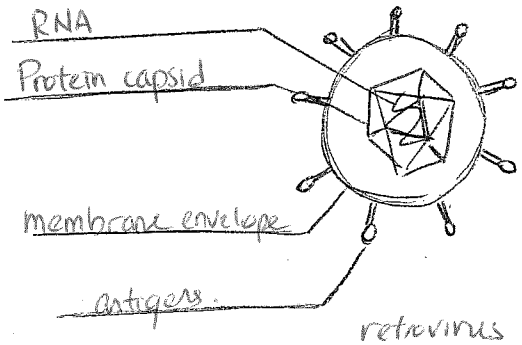
- ☐ Identify and label the generic Protist (*Paramecium sp.*)
- ☐ Explain the current hypothesis on how Protists evolved from Monerans
- ☐ Explain the structure, function, environment and cost-benefit relationship
- ☐ Compare and contrast the Protist Phyla
    - o Identify the defining characteristics of each phyla
    - o Identify examples from each phyla

VIRUSES

Label the bacteriophage & retrovirus = antigens, protein capsid, DNA, RNA, membrane envelope, tail fiber.



Bacteriophage



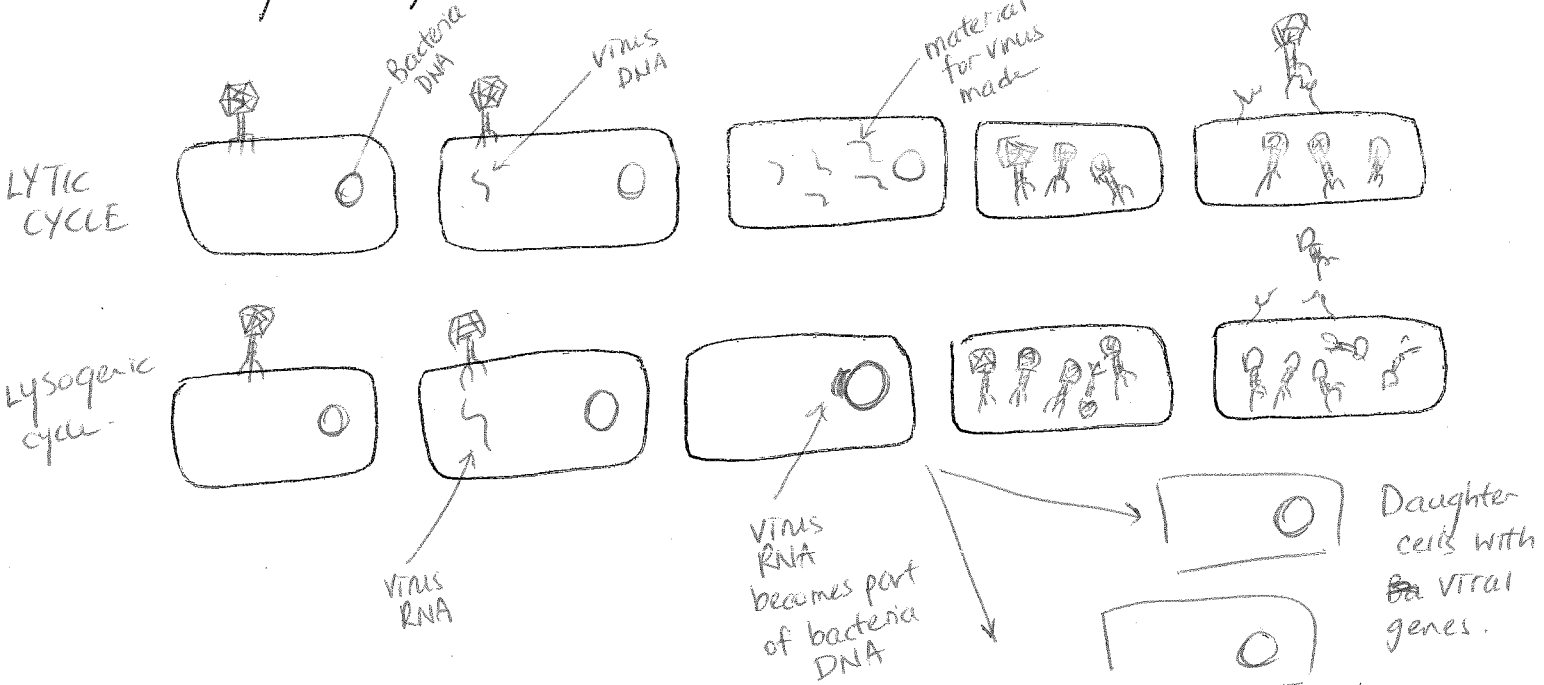
retrovirus

1. What are antigens? Why are they important for defending against pathogens?

Antigens are structures on the outside of the virus, (toxins or proteins).

Antigens act like the face of a virus. Because each antigen makeup is unique to each type of virus, they can be identified by the body to create anti-bodies for defence.

2. Draw the lytic & lysogenic cycle?



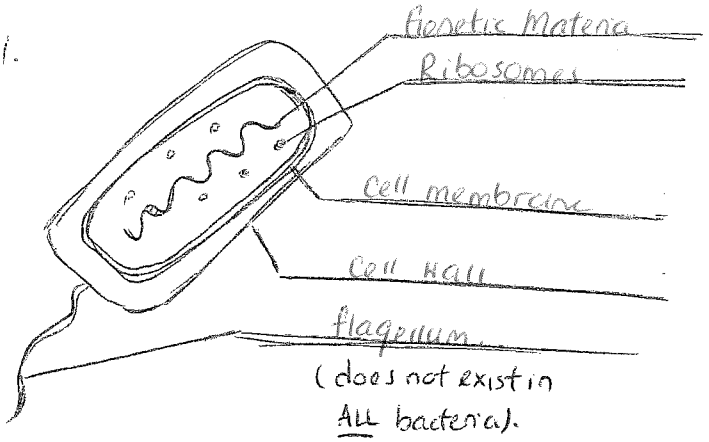
Give 2 examples of ~~by~~ specific & 2 examples of non-specific lines of defense.

Non-specific - skin, oil, sweat, hairs, cilia, stomach acid, saliva, sweat & tears. inflammatory response; fever

Specific - interferons, antibodies.

KINGDOM MONERA (Bacteria)

1.



Label this generic moneran.

- Genetic material
- Ribosomes
- Cell membrane
- Cell wall.

What is the cell wall made of? Peptidoglycan.

What is the cell membrane made of? Lipids

What are the four ways we can classify bacteria?

1. Shape
2. Gram stains
3. Bacteria movement
4. DNA/RNA Sequencing.
5. metabolism → also possible e.g. are they obligate aerobes? obligate anaerobes?

4.

Name the shape of these bacteria.

Cocci Bacilla Spirilla.

5. Bacteria can be classed into four groups, according to their source of energy. What are the sources of energy for:

a. Phototrophic autotrophs. = Sunlight.
b. Phototrophic heterotrophs = Sunlight / organic sources
c. Chemotrophic autotrophs = Inorganic chemicals
d. Chemotrophic heterotrophs = organic sources.

6. Bacteria can also be classed based on how they metabolize the energy they receive.

a. What are the 2 ways that bacteria metabolize the energy?

fermentation / cellular respiration.

b. Which yields more energy?

Cellular respiration.

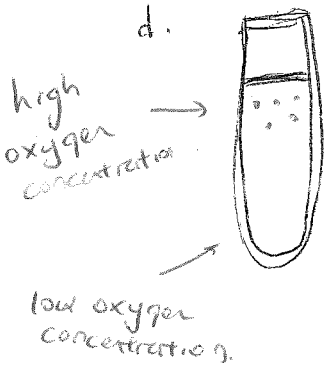
c. Depending on which of the 2 processes, the bacteria can use, (or both), bacteria can be classed in 3 groups. What are those 3 groups?

obligate anaerobe

obligate aerobe

facultative anaerobes.

d.



If your bacteria is obligate aerobe, at what parts of this test tube, containing thioglycolate, would the bacteria be found?

7. Bacteria can "reproduce" in 3 ways: asexual reproduction (binary fission), conjugation or spore production.

a. Which is more likely to be employed during times of low stress? Why?
Binary fission. In a low risk environment, creating genetically identical offspring will not pose a threat to the population.

b. Which is more likely to be employed during times of high stress? Why?
Conjugation. ~~When~~ genetic diversity ~~is high~~ is increased. Therefore, # of traits increases & it is likely that at least a few individuals will survive

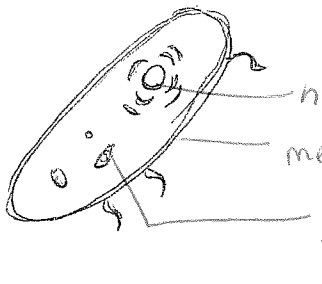
c. Which is more likely to be employed during extreme stress? Why?
Spore production. During times when genetic diversity is unlikely to save the population, spores can allow individuals to survive.

8. Describe the process of conjugation. Be sure to mention F-factor, protein bridge, donor cell, recipient cell in your answer.

1. 2 bacteria create a protein bridge between the 2 cells.
2. The donor cell has ~~or~~ a piece of genetic information (plasmid DNA) that is double stranded.
3. One of the strands is sent to the donor cell through the protein bridge.
4. Both plasmid DNA are replicated. Both cells now have a complete copy of the plasmid DNA.

KINGDOM PROTISTA

1. Label this generic protista. Include: nucleus, cell membrane, membrane bound organelles. Study Paramecium sp. structure as well!



2. What is the endosymbiont hypothesis. List 2 lines of evidence that support it.

The endosymbiont hypothesis posits that the membrane bound organelles of eukaryotes were derived from free-living bacteria. The bacteria lived in a symbiotic relationship within another bacteria, eventually losing its independence.

① Mitochondria & chloroplasts have their own DNA.

② Some organelles can be removed & grown apart from the host cell, with no ill effects to the host cell or the organelle.

Phylum	Example(s)	Distinguishing Characteristic(s)
Ciliophora	Paramecium sp. Stentor sp. Vorticella sp.	Cilia. 
Zoomastigina	Trypanosoma Trichonympha	Animal like protist w/ flagella
Sporozoa.	Plasmodium.	non-motile produces spores.
Sarcodina		pseudopods some produce silicon shells
Euglenophyta	Euglena. sp.	flagellum chloroplasts & red eyespots. Phototrophic heterotrophs.
Pyrrophyta	↖ Gonyaulax polyhedron.	2 flagella, one wrapped around the other like a belt. Thick plates, armored appearance
Chrysophyta		Beautiful silicon shells. stores food as oil. rather than starch.

Acarisomycota — Cellular slime molds.
Lives part of life as amoeba
individuals migrate as a mass when food is scarce

myxomycota. — Acellular slime molds.
Produces plasmodium — single celled multi-nucleated mass
that produces fruiting bodies that spread spores.